CLAIMS

What is claimed is:

1. A method of controlling a display element within an array of display elements by utilizing row and column signals, comprising:

integrating a control circuit within a display element wherein said row and column lines are operably connected to said control circuit which connects to said display element;

maintaining a sufficient power on said row and column lines for continuously powering said control circuit and associated display element;

communicating an activation signal between said row and column lines to which said control circuit is connected;

activating said display element upon receipt of said activation signal by said control circuit; and

maintaining said display element activation by said control circuit from the power on said row and column lines for a predetermined duration after said activation signal is no longer being received.

2. A method as recited in claim 1, wherein said display element contains at least one light emitting diode.

3. A method as recited in claim 1, wherein said activation signal comprises a sufficient change in voltage across said row and column lines to be detected by said

control circuit.

4. A method as recited in claim 3, wherein said activation signal comprises transitions in the signal between said row and column which are identified by said control circuit as an activation signal.

5. A method as recited in claim 1, wherein said predetermined duration comprises a time period bounded by the receipt of a subsequent signal.

6. A method as recited in claim 5, wherein said subsequent signal comprises a signal associated with a subsequent scan of the display element for setting it to a new state.

7. A method as recited in claim 6, wherein said subsequent signal comprises a row signal transitioning from a first state to a second state.

8. A method as recited in claim 6, wherein said subsequent signal comprises a column signal transitioning from a first state to a second state.

9. A method as recited in claim 1, wherein said predetermined duration comprises a count value received from said row and column lines by said controller, that is modified toward a terminating count value.

10. A method as recited in claim 1, wherein said predetermined duration comprises a predetermined time value as determined by control circuit configuration.

11. A method as recited in claim 1, wherein said predetermined duration comprises a duration value programmed in response to the signal relationships between said row and column lines.

12. A method as recited in claim 11, wherein said predetermined duration comprises the duration of the column signals while said row signals are active.

13. A method as recited in claim 11, wherein said predetermined duration comprises the duration of the row signals while said column signals are active.

14. A display element configured for being connected to a set of row and column addressing lines, comprising:

a visual output element adapted for displaying at least two states within a display element;

a control circuit within said display element which is adapted for connecting between a single row and a single column within the set of row and column addressing lines, and said visual output element;

an activation signal detector within said control circuit, said activation signal

detector being adapted for detecting an activation signal on said row and said column lines; and

a visual output element driver within said control circuit, said visual output element driver being adapted for driving said visual output element from power received between the row and column lines;

said control circuit being adapted to activate said visual output element driver to supply power to said visual output element upon detection of an activation signal from said activation signal detector and to continue supplying said power for a predetermined duration after said activation signal is no longer present.

15. A display element as recited in claim 14, wherein said visual output element comprises at least one light emitting diode.

16. A display element as recited in claim 14, further comprising a reset signal detector within said control circuit; wherein upon detecting a reset signal on said row and said column lines said control circuit deactivates said visual output element driver to discontinue supplying power to said visual output element.

17. A display element as recited in claim 14, wherein said activation and reset signals are conveyed as changes in voltage potential between the row and column lines.

18. A system for displaying visual information on a multiplexed array of display elements interconnected on a grid of row and column address lines, comprising:

a row and column driver circuit adapted for activating selected display elements within said array in response to signals received from an image controller;

said row and column driver adapted for outputting a sufficient continuous power between said row and column and superimposing control signals thereupon for controlling said activating of said selecting display elements;

a display element adapted with a element control circuit interposed between the connection to said row and column lines and a visual output element;

said element control circuit adapted for activating said visual output element in response to controlling signals received over said row and column lines from said row and column driver circuit and maintaining the visual output element in an active state for a predetermined duration while other rows and columns of display elements are being activated during the multiplexing of the display.

19. A method of controlling a display element within an array of display elements by utilizing row and column signals separate from a power bus being applied to said display elements, comprising:

integrating a control circuit within a display element;

detecting the presence of an activation signal between said row and column lines by said control circuit; and

directing power from a power bus by said control circuit to said display element

for a predetermined interval following said detected signal.

20. A method as recited in claim 19:

wherein said activation signal is detected as an electric field potential generated between said row and said column sufficiently proximal to said control circuit to be registered therein;

wherein said row and column signals are provided on a wiring grid retained in a substantially fixed position in relation to said display element.

21. A method of extending the active interval of a display element within a multiplexed array of elements interconnected with row and column lines, comprising:

integrating a control circuit within a display element;

charging a capacitor at a first rate in response to the presence of power between said row and column lines as said display element is being selected during multiplexing; and

supplying power at a second rate from said capacitor to a visual output element within said display element;

wherein said first rate substantially exceeds said second rate wherein the time over which the visual output element is active exceeds the time for which power was available between the row and column lines.

22. A method of programming individual input and/or output circuit elements

within an array to an address associated with their physical position within the array, said elements within said array being operably connected to a common bus, comprising:

(a) entering a programming mode for said elements within which non-volatile memory locations may be loaded;

(b) receiving clocking from the common bus;

(c) maintaining an address count based on clocking from said common bus;

(d) comparing external events against a predetermined threshold; and

(e) loading said address count into said non-volatile memory when said external event crosses said predetermined threshold;

whereby said element when not in programming mode will be responsive to a relationship between the address on the common bus and the address count loaded in said non-volatile memory.

23. A method as recited in claim 22, wherein said programming mode is entered as a result of changing the voltage being applied to said element.

24. A method as recited in claim 23, wherein said voltage is increased from a normal range to a programming voltage range to enter the programming mode.

25. A method as recited in claim 23, wherein said programming mode is entered in response to a set of signals received over the common bus.

26. A method as recited in claim 25, wherein said set of signals comprises a predetermined specifier directing said element to enter programming mode.

27. A method as recited in claim 26, wherein said specifier may be directed at elements that have not been programmed.

28. A method as recited in claim 26, wherein said specifier may be directed at all elements, regardless of whether they have been programmed.

29. A method as recited in claim 26, wherein said specifier may be directed at elements programmed within a specified range of addresses.

30. A method as recited in claim 22, wherein said relationship between the address on the common bus and the address count loaded in non-volatile memory is that of equality.

31. A method as recited in claim 22, wherein said relationship between the address on the common bus and the address count loaded in non-volatile memory is that of a complement.

32. A method as recited in claim 22, wherein said relationship between the address on the common bus and the address count loaded in non-volatile memory allows said address on said common bus can be interpreted for selecting separate elements within said array.

33. A method as recited in claim 22:

wherein said common bus provides the same set of common signals to all elements within the array;

wherein said common bus does not provide separate address lines within the array;

wherein said common bus does not provide separate row and column address lines to the rows and columns of elements within the array.

34. A method as recited in claim 22, wherein said external event comprises sensing light intensity changes.

35. A method as recited in claim 22, wherein said external event comprises sensing field intensity changes.

36. A method as recited in claim 35, wherein said fields are generated between rows and columns.

37. A method as recited in claim 35, wherein said changes occur within predetermined frequency limits.

38. A method as recited in claim 35, wherein said changes occur in a pattern.

39. A method as recited in claim 38, wherein said pattern comprises an identifier.

40. A method as recited in claim 38, wherein said pattern comprises a command specifier.

41. A method as recited in claim 35, wherein said fields comprise magnetic field intensity changes.

42. A method as recited in claim 35, wherein said fields comprise electric field intensity changes.

43. A method as recited in claim 22, wherein said external event comprises sensing changes in pressure.

44. A method as recited in claim 22, wherein said external event comprises sensing changes in temperature.

45. A circuit element configured for being programmed to respond according to its specific position within an array of circuit elements interconnected by a set of common signals, comprising:

address extraction circuit within said circuit element adapted for extracting addressing information from said common signals;

sensing element operably connected to said circuit element;

non-volatile memory; and

control circuitry within said circuit element adapted for programming extracted addressing information from said common signals into said non-volatile memory in response to a predetermined threshold condition being crossed for said sensing element;

whereby said control circuitry is further adapted for responding to said programmed addressing information for outputting from said set of common signals and/or collecting data for communication over said set of common signals.

46. A method of programming physical element position upon a circuit element connected to a set of common signals within an array of circuit elements, said programming performed based on the proximity of neighboring elements, comprising:

(a) maintaining an address value based on signals registered from said set of common signals;

(b) entering a programming mode;

(c) registering a trigger signal from an adjacent circuit element;

(d) loading said address value which has been maintained at a predetermined offset from said trigger signal into a memory, wherein said address in said memory forms the address of said circuit element to which said element will respond when operating in a non-programming mode; and

(e) generating a trigger signal to a proximal circuit element at a predetermined time for programming this subsequent circuit element within the array.

47. A method as recited in claim 46, wherein said address value maintenance comprises counting in response to clock signals found within said set of common signals.

48. A method as recited in claim 47, wherein column and row clocks are embedded within said set of common signals.

49. A method as recited in claim 46, wherein said programming mode is entered in response to signals detected within said set of common signals.

50. A method as recited in claim 46, wherein said programming mode is entered in response to a detected change in operating voltage.

51. A method as recited in claim 46, wherein said memory comprises a non-volatile memory wherein the address value is maintained even when the operating power to said circuit element is no longer present.

52. A method as recited in claim 51, wherein said non-volatile memory comprises FLASH ram.

53. A method as recited in claim 46, wherein said trigger signal comprises an optical signal.

54. A method as recited in claim 46, wherein said trigger signal comprises an electric or magnetic field signal.

55. A method as recited in claim 46, wherein said trigger signal is selected from the group of signals capable of being communicated remotely consisting of chemical, mechanical motion, vibration, acoustic, sound, and heat.

56. An apparatus for displaying a text or graphics legend in response to rotating a control knob, comprising:

a rotating knob adapted for connection to a rotary encoding means;

electronic ink with a backing electrode; and

a plurality of electrodes adapted for passing over said electronic ink in response

to the motion of said rotating knob and setting the display state thereof in response to signals received from a controller.

57. An apparatus for displaying text and graphics from a movable member subject to angular displacements of a non-predetermined rate, comprising:

a display providing at least one row of pixels and adapted for being aligned extending radially along said movable member;

means for determining angular position of said display during the travel of said movable member; and

a controller adapted to register the angular position of said movable member containing said display and generate a display output in response to angular position.

58. An apparatus as recited in claim 57, wherein said movable member is selected from movable member subject to angular displacements of non-predetermined rate consisting of: fans, windmills, wheels of moving vehicles, and pant legs of pedestrians.

59. An apparatus as recited in claim 57, wherein said means for determining said angular position of said display comprises:

a photosensor adapted for detecting lighting changes in response to angular position as said angular displacement changes; and

a controller adapted to determine rotational speed in response to the periodicity of said lighting changes being detected.

60. An apparatus as recited in claim 57, wherein said means for determining said angular position of said display comprises:

a magnetic sensor adapted for detecting changes in magnetic flux in response to angular position as said angular displacement changes; and

a controller adapted to determine rotational speed in response to the periodicity of said magnetic flux changes.

61. An apparatus as recited in claim 60, further comprising a magnet positioned proximal to said movable member and adapted for generating sufficient magnetic flux for registration by said magnetic sensor.

62. An apparatus as recited in claim 57, wherein said means for determining said angular position of said display comprises a compass.

63. An apparatus as recited in claim 57, wherein said means for determining said angular position of said display comprises an acceleration sensor for detecting changes in acceleration in response to angular position.

64. An apparatus as recited in claim 63, wherein said acceleration sensor is adapted for sensing the angular position of a movable member being angularly displaced along a plane having a vertical component of travel.

65. An apparatus as recited in claim 64, wherein said movable member comprises a vertically oriented wheel.

66. An apparatus for displaying text and graphics from the rotating blades of a fan, comprising:

a display providing at least one row of pixels and adapted for being aligned extending radially along said blades;

means for determining angular position of said display during the travel of said fan; and

a controller adapted to register the angular position of said blade containing said display and generate a display output in response to angular position.

67. An apparatus for displaying text and graphics from a rotating wheel, comprising:

a display providing at least one row of pixels and adapted for being aligned extending radially along said wheel;

means for determining angular position of said display during the travel of said wheel and

a controller adapted to register the angular position of said wheel containing said display and generate a display output in response to angular position.

68. An apparatus as recited in claim 67, wherein said wheel comprises the wheel of a motor vehicle, bicycle, or wheel chair.